Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	6
Date	12-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.6**	9 KN (min)
2	Marshal Flow	mm	**3.2**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.45**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**71.5**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

Note:

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ii. The results relate only to the items tested.
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Asst. Executive Engineer
Project Division
Yelahanka Zone
Bangalore

Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	7
Date	13-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.3**	9 KN (min)
2	Marshal Flow	mm	**3.1**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.35**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**72.1**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

Note:

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Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	8
Date	13-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.4**	9 KN (min)
2	Marshal Flow	mm	**3.4**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.25**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**72**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

Note:

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Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	9
Date	13-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.8**	9 KN (min)
2	Marshal Flow	mm	**3.7**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.3**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**71.85**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

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Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	10
Date	13-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.6**	9 KN (min)
2	Marshal Flow	mm	**3.51**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.32**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**73**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

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Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	11
Date	13-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.7**	9 KN (min)
2	Marshal Flow	mm	**3.51**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.5**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**71.5**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

Note:

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Test Report
Stability of Mix

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	12
Date	13-Apr-2018

Sl. No.	Description	Unit	Test 1	Requirements as per MORT&H
1	Marshal Stability	KN	**9.7**	9 KN (min)
2	Marshal Flow	mm	**3.42**	2 – 4 mm
3	Percent of Air Voids in mix	%	**4.6**	3 – 6 %
4	Percent of Voids in Mineral Aggregates filled with Bitumen	%	**72.5**	65 – 75 %
5	Density	g/cc	**2.22**	2.22 g/cc

Note:

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Test Report
Binder Content and Mix Gradation

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	1
Date	11-Apr-2018

Sl. No.	Description	Unit	Computation	Test Result
1	Weight of Empty bowl before Extraction (E)	gm	Eb	1080
2	Weight of bowl + Sample before extraction (w_{sb})	gm	w_{sb}	1810
3	Weight of Sample taken for the test (S_b)	gm	$S_b = w_{sb} - Eb$	730
4	Weight of bowl + Sample after extraction (w_{sa})	gm	w_{sa}	1770
5	Weight of Sample after extraction (i.e. washed aggregates) (S_a)	gm	$S_a = w_{sa} - Eb$	690
6	Weight of Filter paper before extraction (F_b)	gm	F_b	2
7	Weight of Filter paper after extraction (F_a)	gm	F_a	4
8	Weight of filler on filter paper (F_d)	gm	$F_d = F_b - F_a$	2
9	Weight of Bitumen without considering Filter paper (W_b)	gm	W_b	41
10	Weight of the Bitumen with considering Filter paper (W_a)	gm	$W_a = w_b - F_d$	39
11	Percentage of the Bitumen (i.e. Binder Content) ($\%_b$)	(%)	$W_a / SbX100$	5.34

Sl. No.	I.S. Sieve size (mm)	Weight Retained (gm)	Percentage of weight Retained (%)	Cumulative Percentage of weight retained (%)	Cumulative % of Passing		Remarks
					Test Result	Gradation Limits as per MORT&H	
1	19.00	0.00	0.00	0.00	100.00	100.00	Gradation satisfies the MORT&H Grade II Specification for Bituminous Concrete
2	13.20	673.00	16.83	16.83	83.18	72-100	
3	9.50	432.00	10.80	27.63	72.38	70-88	
4	4.75	231.00	5.78	33.40	66.60	53-71	
5	2.36	476.00	11.90	45.30	54.70	42-58	
6	1.18	342.00	8.55	53.85	46.15	34-48	
7	0.60	436.00	10.90	64.75	35.25	26-38	
8	0.30	428.00	10.70	75.45	24.55	18-28	
9	0.15	381.00	9.53	84.98	15.03	12-20)	
10	0.08	362.00	9.05	94.03	5.97	(4-10)	

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Test Report
Binder Content and Mix Gradation

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	2
Date	11-Apr-2018

Sl. No.	Description	Unit	Computation	Test Result
1	Weight of Empty bowl before Extraction (E)	gm	Eb	1080
2	Weight of bowl + Sample before extraction (w_s)	gm	w_{sb}	1800
3	Weight of Sample taken for the test (S_b)	gm	$S_b = w_{sb} - Eb$	720
4	Weight of bowl + Sample after extraction (w_s)	gm	w_{sa}	1759
5	Weight of Sample after extraction (i.e. washed aggregates) (S_a)	gm	$S_a = w_{sa} - Eb$	679
6	Weight of Filter paper before extraction (F_b)	gm	F_b	2
7	Weight of Filter paper after extraction (F_a)	gm	F_a	4
8	Weight of filler on filter paper (F_d)	gm	$F_d = F_b - F_a$	2
9	Weight of Bitumen without considering Filter paper (W_b)	gm	W_b	40
10	Weight of the Bitumen with considering Filter paper (W_a)	gm	$W_a = w_b - F_d$	38
11	Percentage of the Bitumen (i.e. Binder Content) ($\%_b$)	(%)	W_a/ SbX100	5.28

Sl. No.	I.S. Sieve size (mm)	Weight Retained (gm)	Percentage of weight Retained (%)	Cumulative Percentage of weight retained (%)	Cumulative % of Passing		Remarks
					Test Result	Gradation Limits as per MORT&H	
1	19.00	0.00	0.00	0.00	100.00	100.00	Gradation satisfies the MORT&H Grade II Specification for Bituminous Concrete
2	13.20	673.00	16.83	16.83	83.18	72-100	
3	9.50	432.00	10.80	27.63	72.38	70-88	
4	4.75	231.00	5.78	33.40	66.60	53-71	
5	2.36	476.00	11.90	45.30	54.70	42-58	
6	1.18	342.00	8.55	53.85	46.15	34-48	
7	0.60	436.00	10.90	64.75	35.25	26-38	
8	0.30	428.00	10.70	75.45	24.55	18-28	
9	0.15	381.00	9.53	84.98	15.03	12-20)	
10	0.08	362.00	9.05	94.03	5.97	(4-10)	

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Bangalore

Test Report
Binder Content and Mix Gradation

Project Name	Improvements of roads for layout where the Cauvery and UGD works are in progress in Ward No.05 and Ward No.06 Byatarayanapura Sub Division
Client	Executive Engineer Project Yellahanka Division
Job No	MCTPL/BBMP/Project Division Yelahanka ZONE /P-7/1/2017-2018
Mix Type	Bituminous Concrete (BC)
Contractor	Sri. R. Satheesh
Test Method	Specification for Road & Bridge Works, MORT&H, Revision V.
Location	Bay
Material	Bituminous Concrete mix
Sample No	3
Date	12-Apr-2018

Sl. No.	Description	Unit	Computation	Test Result
1	Weight of Empty bowl before Extraction (E)	gm	Eb	1080
2	Weight of bowl + Sample before extraction (w_s)	gm	w_{sb}	1790
3	Weight of Sample taken for the test (S_b)	gm	$S_b = w_{sb} - Eb$	710
4	Weight of bowl + Sample after extraction (w_s)	gm	w_{sa}	1750
5	Weight of Sample after extraction (i.e. washed aggregates) (S_a)	gm	$S_a = w_{sa} - Eb$	670
6	Weight of Filter paper before extraction (F_b)	gm	F_b	2
7	Weight of Filter paper after extraction (F_a)	gm	F_a	4
8	Weight of filler on filter paper (F_d)	gm	$F_d = F_b - F_a$	2
9	Weight of Bitumen without considering Filter paper (W_b)	gm	W_b	40
10	Weight of the Bitumen with considering Filter paper (W_a)	gm	$W_a = w_b - F_d$	38
11	Percentage of the Bitumen (i.e. Binder Content) ($\%_b$)	(%)	W_a/ SbX100	5.35

Sl. No.	I.S. Sieve size (mm)	Weight Retained (gm)	Percentage of weight Retained (%)	Cumulative Percentage of weight retained (%)	Cumulative % of Passing		Remarks
					Test Result	Gradation Limits as per MORT&H	
1	19.00	0.00	0.00	0.00	100.00	100.00	Gradation satisfies the MORT&H Grade II Specification for Bituminous Concrete
2	13.20	677.00	16.93	16.93	83.08	72-100	
3	9.50	436.00	10.90	27.83	72.18	70-88	
4	4.75	235.00	5.88	33.70	66.30	53-71	
5	2.36	480.00	12.00	45.70	54.30	42-58	
6	1.18	346.00	8.65	54.35	45.65	34-48	
7	0.60	440.00	11.00	65.35	34.65	26-38	
8	0.30	432.00	10.80	76.15	23.85	18-28	
9	0.15	385.00	9.63	85.78	14.23	12-20)	
10	0.08	366.00	9.15	94.93	5.08	(4-10)	

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